Request For Deviation / Waiver

Waiver # DAS-W04 Rev.1 Date 12 July 2002

Deviation ☐ Waiver ☒

Originator

Name:	Address:
ITT Industries, Inc	ITT Industries, Inc. 1761 Business Center Drive Reston, VA 20190

Title Of Deviation / Waiver: DAS DMU Loss of Synchronization Performance

Contract Number: GS-35-0109J, Order # S 87070-Y, Task 11 **Cage Code:** **9M715**

Classification: Minor ☐ Major ☒ Critical ☐

Part Number: 021-147012 / 021-147010 Model 6002 **Title:** DAS Demodulator Model 6002

Effectivity: All DAS pre-production and production DMUs **Recurring Deviation/ Waiver:** Yes. ☐ No ☒

Effect on Cost: None, if approved **Effect on Schedule:** None, if approved

Effect on Logistics Support, Interface or Software: None, if approved

Reference Documents: SRD Paragraphs:

3.2.4.2.1.12.a — "…Symbol synchronization shall be maintained for 3 dB less C/No than required for $10E^{-5}$ P_E performance … for transition densities of at least 40% for NRZ … and any transition density for biphase …"

3.2.4.2.1.12.b — "…Symbol synchronization shall be maintained for 2 dB less C/No than required for $10E^{-5}$ P_E performance … for NRZ …transition densities between 25% and 40%."

Description of Deviation / Waiver:

A waiver is requested for the requirements stated above. DAS does not meet the symbol synchronization requirements over the entire range of specified data rates. DAS will maintain symbol synchronization down to 3.0 dB below the C/No required for data rates <100 kbps and at least 2.4 db below the C/No required for 10^{-5} P_E at rates ≥100 kbps.

Note: All testing was done at 50% transition density since no available test equipment will generate 20-40% transition density. The impact of transition density (here reduced to 25%) is to characterize it as a change in the effective BLT product, which affects the loop phase error due to thermal noise. As a result, it can be shown (via analysis) that the impact from 25% transition density vs. 50% is a loss of 0.33 dB. Thus, since the results for 50% transition density in OCT4 showed that sync is maintained for SNR reductions ≤2.44 dB, the requirements are partially verified.

Need for Deviation / Waiver:

Below 100 kbps, DAS fully meets the requirements; however, without a costly firmware redesign, DAS will not maintain symbol synchronization for the entire range of required data rates based on the aforementioned limitations. Performance data for rates ≥100 kbps

Modulation, Data Rate	Measured Eb/No decrease before loss	
BPSK, 100 kb/s	2.4 dB	
QPSK, 100 kb/s	3.0 dB	meets specification
BPSK, 130 kb/s	2.4 dB	
QPSK, 130 kb/s	3.0 dB	meets specification
BPSK, 150 kb/s	2.7dB	

Corrective action taken:

None. This model will not meet this specification without a major firmware redesign.

Submitting Activity

Name:	Title:	Signature:	Date:
Walter E. Kearns	ITT – AES, DAS PM		8/1/2002

Customer Approval / Disapproval

Approval ☐	Disapproval ☐	Date:
Name:	**Title:**	**Signature:**